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**Evaluating the Effectiveness of a Goal-Directed Intervention on the Social Interaction of  
Children with Neurodevelopmental Disabilities**

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**Senior Honors Thesis**

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### **Abstract**

Social interactions are one of the most important aspects of a child's development. For most typically developing children, social cues are acquired naturally; however, children with neurodevelopmental disabilities have a significantly harder time forming peer relationships, leading to poor social interaction skills, and few opportunities to acquire new social skills. No studies have proven successful at improving social interaction skills among low functioning individuals with profound neurodevelopmental disabilities.

This research study sought to address this need through an eight week intervention developed to improve social skill deficits of youth with profound neurodevelopmental disabilities at Spaulding Youth Center (SYC), a residential facility in Northeast United States. A randomized control design was used for this study, with ten youth in the intervention group and nine youth in the control group. Participants were recruited from two residential houses at SYC, all of whom had identified social interaction needs. Students in the experimental group participated in an eight week goal-directed after school program one hour each day, five days each week and targeted specific social needs. The control group participated in their regular after school activities. Results showed a significant improvement among two youth in the intervention group. The intervention group as a whole did not significantly improve. This has implications for future practice.

### **Introduction**

Autism Spectrum Disorders (ASD) is a term used to describe a continuum of neurological disorders classified by marked impairments in social interactions, communication, and stereotypical behaviors. In 2007, the Center for Disease Control and Prevention (CDC) estimated the prevalence of autism and related disorders to average 1 in 150 individuals in the United States. By 2010, estimates increased to 1 in 110 individuals (CDC, 2010). Due to the

drastic and continued increase in children diagnosed with autism, much research has been devoted to understanding the disorder and the implications it has on those affected by it. Developing appropriate interventions for supporting the social needs of children with ASD has become a growing concern.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) describes the profound impact that autism has on social interactions, communication skills, and behavioral difficulties (American Psychiatric Association, 1994). Children with ASD have a marked deficit in social interactions and communication, varying in severity by each child. They have particular difficulty understanding and interpreting nonverbal cues from their peers and often do not show emotional reciprocity. There is usually a failure to develop age-appropriate relations with their peers which hinders their social relationships. Many children with ASD have delayed speech and language skills, further isolating them from their typically developing peers. In addition, many children with autism demonstrate stereotypical or repetitive behavior such as rocking or hand flapping and may become unusually upset with minor changes in routine (CDC, 2010). The combination of characteristics leaves many children with ASD socially isolated and with few peer supports. This can have significant implications for the child's development and adjustment abilities later in life.

## **Literature Review**

### **Importance of Social Interaction**

Social interactions are among one of the most important aspects of a child's development. The ability to engage in play with peers is deemed a child's main occupation, or meaningful activity. Through interactions with others, children learn to share, plan, organize and lead others (Odom et al., 1999). Odom et al. identified the development of social skills to perform these

tasks as a “fundamental step” in early development. Gagnon and Nagle (2004) reiterated the importance of interacting with peers because it provides children with the opportunity to learn and respond to social norms. For most typically developing children, social cues are acquired naturally. However children with autism have a significantly harder time forming peer relationships, which can lead to decreased interactions, creating fewer opportunities to acquire social interaction skills. According to Guralnick (1999), children who experience this negative spiral in social interaction development often experience social isolation. Furthermore, these children are likely to continue the established negative trajectory in social skill development leading to later adjustment difficulties. It is thus crucial for the development of effective interventions to facilitate social skill development among children with autism and other neurodevelopmental disabilities.

### **Interventions to Enhance Social Interaction**

Interventions have focused on indirectly or directly supporting children who have limited social skills. Indirectly, peer-training and staff training interventions have had positive results in improving language acquisition and social skill development among both typically developing students as well as students with a variety of disabilities. Studies by Girolametto, Weitzman, and Greenberg (2003) and Mahoney and Wheeden (1999) trained staff members and teachers to effectively promote language and social skill development among their students. In both studies, teachers’ styles of promoting interactions and participation were examined by focusing on the frequency and duration of their students’ verbal expressions. Girolametto et al. (2003)’s study provided an in service training program to teachers of typically developing toddlers and preschool children in four licensed day care centers. The program focused on child-oriented responses, interactions promoting responses, and language modeling for the students, rather than

a directive approach often seen in schools. Results showed that after a 14 week training program, teachers were better able to facilitate their students' verbalizations and those children taught by trained teachers expressed a significantly greater number of utterances than those with untrained teachers. Similarly, Mahoney et al. (1999)'s study examined the effectiveness of teachers using a directive style in teaching preschool children with special needs. Contrary to the belief that children with disabilities need adult directions to engage in meaningful learning activities, results showed that strong directive teaching styles were associated with low levels of children's initiations. Results indicate the need for less directive-style teaching and more open-ended interactions to facilitate students' initiations and development of language and social skills.

In addition to training teachers to support children's educational and social needs, several studies have recruited help from peers in teaching social skills to students. A study by Sperry, Neitzel, and Engelhardt-Wells (2010) examined the effectiveness of peer mediated instruction in fostering the development of social skills among children with ASD. Based on the social learning theory and behavioral approach, typically developing peers were given instruction on how to interact with children with ASD. After learning specific techniques to increase the opportunities for interactions among all students, the typically developing students were able to successfully interact more frequently with peers with ASD. Results showed that peer-mediated interaction can increase social interactions of individuals with ASD.

A comparative study done by Carter and Pesko (2008) likewise sought to determine the effectiveness and likelihood of implementing various social skill interventions in high schools with students with and without severe disabilities. A Social Interaction Intervention Questionnaire was given to 81 high school educators, who rated 12 intervention techniques in regards to their perceived effectiveness, feasibility, and actual use in the classroom. The

strategies included teaching students to use communication systems, peer buddy programs, special educator support, teaching assistant support, and teaching social skills to students with disabilities, among others. Like Sperry et al.'s 2010 study, the results from this study showed that peer buddy support was effective in increasing social skills. Special educator support, paraprofessional support, and peer buddy support received the highest ratings in effectiveness, feasibility and use, while self-monitoring and disability awareness received very low ratings for all three categories. The findings suggest that children learn social skills best through observing and interacting with those around them, more than simply being taught social skills.

The majority of studies conducted on social interactions among youth with ASD involved a directive group therapy approach. An intervention by Owens, Granader, Humphrey, and Baron-Cohen (2008) harnessed a unique naturalistic approach, in which LEGOs were used as a means to increase social skills among high functioning children with ASD. Because many individuals with ASD have a methodical, systematic approach to the world, LEGOs were of greater interest than many typically used creative role playing exercises. In this study, a traditional social skill intervention, the social use of language program (SULP) was compared to LEGO therapy. Groups of three individuals with autism were asked to work together on various LEGO building projects and each individual was assigned a role to play: engineer, supplier, and builder. Through their assigned roles, students were forced to collaborate and interact in order to build various projects. While focused on the construction projects, students inadvertently practiced social interactions. Following intervention, parents were interviewed with the Vineland Adaptive Behavior Scale (VABS), which asks questions about adaptive behaviors in several domains including socialization and communication. The Gilliam Autism Rating Scale Social Interaction Subscale (GARS) was also used to evaluate changes in social skills unique to autism. Finally, a

parent satisfaction and child enjoyment questionnaire was provided for additional feedback. Results indicated that socialization and communication increased, and maladaptive behavior decreased following both the LEGO intervention as well as Sulp. Social difficulties specific to autism decreased with LEGO therapy, as shown through the GARS, compared to no change in the Sulp intervention, indicating an advantage of LEGO therapy.

A 30 week directive group intervention for high functioning students with ASD proved effective at improving social competence and social skills among those involved. Group participants and leaders jointly set goals for the program and those areas became the focus of the intervention. Various activities were used for an hour each week for 30 weeks that addressed the goals. Team building activities and group games were used to encourage students to interact with each other. Each participant was scored by the Walker-McConnell Scale of Social Competence and Social Adjustment (WMS), which is divided into three subcategories: teacher-preferred social behavior, peer-preferred social behavior, and school adjustment behavior. They were also scored by the Massachusetts General Hospital YouthCare Social Competency/Social Skill Development Scale (SCDS), which consists of a 55 item scale, rating children on interpersonal skills, anxiety, self awareness and general social skill competencies. Significant gains were made in anxiety management, joint attention, flexibility, and transitions, all goals set by participants. Results showed that collaborative planning coupled with group sessions focused on specific goals was effective in meeting the social skill needs of children with high functioning autism (Cotugno, 2009).

A pilot study by White et al. (2010) focused on four individuals who experience both ASD and anxiety. Because anxiety is a common co-diagnosis, the aim of this study was to help individuals decrease their anxiety in order to improve social interactions, by use of the



Multimodal Anxiety and Social Skills Intervention (MASSI). By decreasing anxiety, students would then be more likely to engage with their peers and be less likely to shy away from social situations. Approaches included individual therapy sessions, group therapy, and parental involvement; allowing students to practice their newly acquired skills at home in a safe environment.

Despite the vast number of studies examining educational needs and social skill development among children with varying abilities, none of the studies have focused on individuals with profound autism and neurodevelopmental disabilities. Studies have remained focused on mainly higher functioning, individuals who are verbal. There is a great need for interventions involving lower functioning individuals. The purpose of this study is to examine the effectiveness of a goal-directed after school program at improving the social interaction and behavior among youth with severe neurodevelopmental disabilities.

### **Methods**

A randomized control design was utilized for this study, with two groups of ten youth. Participants in the experimental group participated in an eight-week goal-directed after school program targeting social interaction skills and those in the control group participated in their regular after school activities. This study took place at Spaulding Youth Center, a residential facility designed to support the educational and emotional needs of children with neurodevelopmental disabilities. The facility is located in Northeastern United States. This study was approved by the Institutional Review Board for Research at the University of New Hampshire and Spaulding Youth Center.

## **Participants**

Youth who attended the Spaulding Youth Center (SYC), a residential facility for individuals with neurodevelopmental disabilities, were chosen for this study as a convenient population. All of the participants had identified difficulty with social interactions. All youth (24 total) who lived in two of the residential houses at SYC, were eligible to participate. Parental permission slips were distributed asking for consent for their child's participation in the study, and 20 were returned. Data was lost for one participant, so scores from 19 students were analyzed. Participants included 15 males and 4 females with a mean age of 15 years, ranging between 9 and 21 years at the time of the study. Fifteen of the participants had Autism, three participants had psychiatric disorders with severe learning disabilities, and one participant had a significant developmental disability.

## **Procedure**

Each participant was evaluated using the *Evaluation of Social Interaction* (ESI) (Fisher & Griswold, 2010) to determine his or her baseline quality of social interaction. After the pre-test evaluation, the participants were randomly assigned to groups by administration at SYC. Those in the intervention group participated in an eight-week afterschool program designed to enhance and promote social interaction skills. The program was run by an occupational therapy student, with experience working with children with disabilities. The control group engaged in their typical after school activities for the same hour, without goal-specific activities. After eight weeks, each participant was re-evaluated using the ESI. A research assistant who was an occupational therapy graduate student and occupational therapist, both trained and calibrated in the administration of the ESI completed all the pre-test measures. ESI observations occurred during school activities or in the residence halls during naturally occurring social interactions

that staff identified would be appropriately challenging for each participant. The primary researcher, also trained and calibrated in the ESI, completed all post-test assessments, again by observing the youth in challenging and relevant social interactions during activities at school or in the residence hall. All evaluators were blind to group assignment and the primary researcher had no knowledge of the participants' pre-test results when she did her post-test. The researcher was also not involved in any aspect of the after school program.

### **Measurement instrument**

The Evaluation of Social Interaction (ESI) is a standardized assessment tool designed to assess the quality of a person's social interaction performance as they engage in a natural context. Each individual is observed as he/she engages in two social interactions, determined by the individual or teacher or parent to be relevant and challenging. After observing the social interactions, the occupational therapist scores the two interactions, by rating the performance of the individual on 27 criterion-referenced social interaction skills. Each skill is rated on a 4 point scale, marked as competent, questionable, ineffective or severely limited performance. The 27 social interaction skills are listed in Table I. The ESI is standardized on over 1000 people (Fisher & Griswold, 2010). Simmons, Griswold, and Berg (2010) used the many-faceted Rasch (MFR) analysis to verify the internal scale validity of the ESI as a measure of social interaction as well as the reliability of raters once they have gone through a training course to learn administration and scoring criteria. Using MFR analysis, the level of challenge of the intended purpose of a social interaction, the level of difficulty of each skill item, and rater severity are used to calculate an ESI measure. Simmons et al. (2010) reported that the ESI measure is sensitive enough to distinguish between those who have and those who do not have a disability.

Griswold and Townsend (in press) found the ESI sensitive to detect difference in the quality of social interaction between children with a disability from those without a disability.

Table I. Social interaction skills found on ESI.

Initiating and terminating social interaction:

Approaches/Starts: greeting and/or initiating interaction  
 Concludes/Disengages: ending interaction

Producing social interaction:

Produces speech: communicating using speech, or signed or augmentative messages  
 Gesticulates: using gestures to communicate  
 Speaks fluently: speaking tempo

Physically supporting social interaction:

Turns towards: turning body and face toward social partner  
 Looks: making eye contact  
 Places self: keeping personal space and distance  
 Touches: making physical contact with social partner  
 Regulates: controlling impulses and behaviors

Shaping content of social interaction:

Questions: requesting information or opinion  
 Replies: providing relevant response and detail to questions and comments  
 Discloses: sharing personal information, opinions, and feelings about oneself or others  
 Expresses emotion: displaying affect and emotions  
 Disagrees: disagreeing with social partner's stated suggestions or stated point of view  
 Thanks: acknowledging information, compliments, help or material objects

Maintaining flow of social interaction:

Transitions: changing topic of conversation  
 Times response: responding not too soon or too late, interrupting  
 Times duration: sending messages that are too long or too short  
 Takes turns: dominating, being dominated

Verbally supporting social interaction:

Matches language: using tone of voice, dialect, and level of language appropriate for social partner  
 Clarifies: making sure social partner follows conversation  
 Acknowledges/Encourages: responding to social partner, encouraging continued interaction  
 Empathizes: supporting social partner's feelings and experiences

Adapting social interaction:

|               |  |
|---------------|--|
| Heeds:        | staying with the intended purpose of social interaction          |
| Accommodates: | anticipating and preventing problems during a social interaction |
| Benefits:     | demonstrating social interaction skill problems that persist     |

**Intervention Program**

The intervention program was designed based on the dominant needs of the youth as identified in their pre-test. Noted problems included not responding to a peer's question or comment and responding with an irrelevant or short answer. Other problems included not asking questions as needed to support an interaction, not clarifying when needed by the social partner, and not facing the social partner when interacting.

An occupational therapy student determined all of the group activities for the intervention group, with consultation from her faculty mentor, an occupational therapist. Each hour-long session included four activities. The sessions began with a warm-up activity, to get the youth actively engaged and physically moving. The subsequent activities provided opportunities for the participants to work on one or more of the identified needed skills. The activities progressed from easy to more challenging within a given session, based on complexity of directions and social interaction demands required for each activity. Common childhood activities and games were used to provide a natural context of play. Furthermore, using common childhood games gave the participants an increased repertoire of play activities for the future. Games included Simon Says, freeze dance, hopscotch, and "Mother May I?" Games were often adapted to offer more opportunity for social interaction skill development and practice and to facilitate whole group participation. SYC staff were present to support the youth throughout the games. Their presence also allowed them to learn more about adapting games to address the needs of the youth. After each session, the occupational therapy student and staff discussed the participants'

social interaction. The occupational therapy student also provided positive feedback to staff members on the support that they provided to the youth, in an effort to continue their support during future activities and throughout other times of the day. The OT student and staff also had the opportunity to collaboratively choose activities for the next day to target specific social skills with which the youth were struggling.

One activity that the youth requested be repeated several times during the program was called “Comet Questions.” Students are lined up in two lines with a hula-hoop placed several feet in front of them. Each child takes a sock filled with a tennis ball, or “comet” and tries to throw the comet into the hula-hoop. If the student successfully makes the hoop, he returns to the line and the next student takes his turn. If he is not able to throw the “comet” into the hula-hoop, he picks a premade question out of a bucket and asks his team the question. Once the question is answered, the next student may go. The goals of “Comet Questions” are directly related to the areas of difficulty previously noted. They included being able to ask a partner a question, responding to a question with a relevant answer, taking turns and facing their social partner when speaking. Students were also encouraged to speak in full sentences, when able, to promote increased duration of messages. Modifications to the game included making questions with yes/no replies for students who were lower functioning and not able to comprehend more complex questions. For students who were higher functioning, the expected response duration was increased.

Another popular game was “Jumbo Bingo” and is played much like the classic version of Bingo. Prior to the activity, staff members created Bingo boards by taping flashcards with pictures and the equivalent word on them to a poster board. Students are then split into two groups and each team is given a Bingo board. Each student is asked to individually come up and

randomly choose a flashcard from a pile, matching the cards seen on the Bingo board. He/she then describes the picture seen on the card to the team. If a team has the matching card on their board, they cover the space with a piece of paper. Whichever team covers three spaces in a row first wins. The goals of “Jumbo Bingo” were to have students vocalize and describe pictures seen on each flashcard, listen and match words and descriptions from flashcards, take turns, and provide relevant responses relating to the pictures. These goals targeted several of the areas with known difficulty such as providing relevant responses when asked to describe the picture, facing the social partner when describing the flashcards, and taking turns by having one student describe a card at a time. Modifications included having students simply state the word rather than describe the picture seen for lower functioning students. For increased difficulty, students in each team could ask questions about the picture on the flashcard until they determine the picture.

### **Data Analysis Methods**

The effectiveness of the social interaction intervention was determined by comparing the pre-test and post-test ESI measures as the dependent variables. Raw scores from individual ESI items were entered into the ESI computer-software program by each evaluator. The computer program generated an ESI measure for each evaluation indicating the quality of social interaction. Pre- and post- test measures were then compared for each individual to determine a change in quality of social interaction. According to Fisher and Griswold (2010), if the difference between the measures is greater than the sum of the standard error of measurement of the two measures, there is a statistical difference between the two. The participants in the two groups were compared to determine if the intervention resulted in a change different from that of participants in the control group. In addition to comparing the pre- and post- test results of individual participants, SPSS software was used to run an independent t-test to determine if

there was a significant change in social interaction skills between the two evaluation periods in either the control or intervention group.

### Results

By comparing individual's pre- and post- ESI measures, only two students improved significantly between the two intervention periods, both from the intervention group. Two students decreased significantly between evaluation periods; one from the control group and one from the intervention group. These two students participated and engaged in conversation together during a meaningful activity that was chosen by them during their pre-test evaluation. Their post-test results were in keeping with behavior that was typically occurring throughout the school day, and the activity observed was not chosen by them, which is likely the reason for their significant decrease. Two students' scores remained the same. The remaining individuals who participated in the study did not show significant change. Eight students' post ESI measures were higher than their pre ESI measures, with an average improvement of .175 logits, however the increase was less than the combined standard error, thus signifying an insignificant change. Five students' post ESI measures were lower than their pre ESI measures, with an average decrease of -.18 logits, again indicating an insignificant change.

#### Control Group

| <u>Pre-Test</u> | <u>Post-Test</u> | <u>Diff. of Pre-Post</u> | <u>Sum of Standard Errors</u> |
|-----------------|------------------|--------------------------|-------------------------------|
| -6              | -3               | .3                       | .34                           |
| -5              | -4               | .1                       | .36                           |
| -3              | -3               | 0                        | .36                           |
| -2              | -1               | -.8**                    | .4                            |
| -2              | -3               | -.1                      | .36                           |
| .1              | 0                | -.1                      | .32                           |
| .1              | 0                | -.1                      | .32                           |
| .2              | -.1              | -.3                      | .34                           |
| .4              | .5               | .1                       | .32                           |



Intervention Group

| Pre-Test | Post-Test | Diff. of Pre-Post | Sum of Standard Errors |
|----------|-----------|-------------------|------------------------|
| -9       | -3        | .6**              | .4                     |
| -8       | -7        | .1                | .44                    |
| -8       | -1.1      | -.3               | .51                    |
| -6       | -4        | .2                | .4                     |
| -5       | -3        | .2                | .36                    |
| -4       | -1        | -.6**             | .4                     |
| -.2      | .1        | .2                | .34                    |
| -.1      | .6        | .7**              | .34                    |
| 0        | 0         | 0                 | .32                    |
| 0        | .1        | .1                | .32                    |

\*\*Statistically significant change

By running an independent t-test through SPSS software, it was determined that there was no significant change by either group between the two evaluation periods. Equal variances were assumed because the p-value was greater than .05 ( $p=.604$ ), resulting in .188 significance of the two-tailed test. In order to confirm a significant change, results must be less than .05 meaning that there was no significant between evaluations in either group.

**Group Statistics**

| Group                             | N  | Mean   | Std. Deviation | Std. Error Mean |
|-----------------------------------|----|--------|----------------|-----------------|
| Difference_Pre_Post Control Group | 9  | -.1000 | .31225         | .10408          |
| Experimental Group                | 10 | .1200  | .37947         | .12000          |

**Independent Samples Test**

|                     |                         | Levene's Test for Equality of Variances |      |
|---------------------|-------------------------|---|------|
|                     |                         | F                                       | Sig. |
| Difference_Pre_Post | Equal variances assumed | .279                                    | .604 |

**Independent Samples Test**

|                     |                             | Levene's Test for Equality of Variances |      |
|---------------------|-----------------------------|---|------|
|                     |                             | F                                       | Sig. |
| Difference_Pre_Post | Equal variances assumed     | .279                                    | .604 |
|                     | Equal variances not assumed |   |      |

|                     |                             | t-test for Equality of Means |        |                 |                 |                       |
|---------------------|-----------------------------|------------------------------|--------|-----------------|-----------------|-----------------------|
|                     |                             | t                            | df     | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| Difference_Pre_Post | Equal variances assumed     | -1.370                       | 17     | .188            | -.22000         | .16056                |
|                     | Equal variances not assumed | -1.385                       | 16.885 | .184            | -.22000         | .15885                |

**Discussion**

Studies to date have yet to show an effective social skill intervention for children with severe disabilities, and participants in this study were lower functioning than those previously mentioned in past research. Thus regardless of the knowledge and goals we had about each child, there has yet to be successful strategies for effectively helping this population of individuals. It was difficult to find activities that equally supported the verbal and non verbal students, challenging them to develop their skills. Past studies such as Owens et al. (2008) that proved effective in improving social skills differed from this study in the functional abilities of its participants. Students in this study were much lower functioning than participants in past studies that showed improvements.

The results of this study indicate that an after school program for an hour each day for eight weeks is not sufficient in facilitating improvement in social interactions among youth with neurodevelopmental disabilities. Social interactions are an integral part of every individual's day, regardless of setting. Interventions designed to enhance social participation thus need to mirror this principle, rather than being a separate entity. According to the Occupational Therapy Intervention Process Model (OTIPM) (Fisher, 2009), there are four continua for evaluating activities that are used in interventions. They consist of relation to daily life, ranging from irrelevant to relevant, ecological relevance, ranging from simulated to natural, source of purpose and source of meaning, both ranging from therapist to client. The OTIPM states that activities used in intervention are more effective if they are client-centered and client-chosen, relevant to daily life and performed in a natural context.

According to this model, the social interaction intervention did not satisfy these needs. Students were taught social skills during the after school program and were able to practice these skills within the context of after school games; however, there was no encouragement or motivation to continue implementing these skills throughout the school day. Children with known deficits in social interaction are not able to easily apply social concepts into their routine, and this study did not satisfy the OTIPM continua in being relevant and natural in context. Although the social skills practiced during the activities were relevant to daily life, the activities themselves did not carry over to the participants' needs in the classroom or after school setting. The games did not provide an opportunity to practice naturally occurring activities that were relevant to their needs. This suggests that a more comprehensive program, involving necessary daily skills such as interacting with teachers in the classroom may create a greater opportunity for students to naturally engage with each other to practice and receive guidance in newly

acquired skills. Sperry et al. (2010) and Carter et al. (2008)'s studies support this idea of peer involvement rather than directly teaching social skills as a separate intervention.

The OTIPM suggests another area that was not addressed in this study. Although the study was designed with participants' social skill deficits in mind, it was not truly client-centered. The model describes the importance of collaborating with clients to assess, plan and implement intervention strategies. The students observed were not aware that they were part of a study and were not aware of specific goals they were supposed to be working towards. They were thus participating merely because it was the assigned afterschool activity and not because they chose to improve a specific area of social skill development. In order to motivate students to actively participate in the intervention, they must be aware that there is an intervention in which they are involved. These results indicate the need for a more client-centered approach to intervention. By involving participants in goal planning, they may be more motivated to meet those goals, as shown in the effectiveness of Cotugno's (2009) study.

Another area noted through observations was the disparity between society's expectations of social interactions and the facility's expectations for their students. Although Spaulding Youth Center sought to promote social skill development, the students were not held to the same standards as the general population. For example, due to safety concerns, it was common for participants to be paired one-on-one with a staff member and receive little interaction time with other peers. They were thus not expected or able to converse with their peers as typically developing young adults would. Meals were similar with only one or two students at each table, each with a staff member and no expectation or opportunity to interact with peers. There was little opportunity for students to engage in conversation about their day or schoolwork, with staff or peers. Overall student expectations were developed based on specific needs of the students to

function effectively at Spaulding Youth Center, and not necessarily in society outside of the center.

### **Limitations**

This study provides a basis upon which future studies can be built. Perhaps the most significant limitation was the short, isolated intervention, in which students were not able to generalize acquired skills to their everyday life. Although students were able to practice skills during the after-school session, there was little carry over to the rest of their days. A more integrated approach in which the intervention is embedded throughout the course of the day may be an area to explore further. Such ongoing opportunities to provide newly acquired skills may have led to a more successful intervention.

### **Future Research**

This study suggests the need for future research, specifically focusing on an imbedded intervention aimed at the social interactions of youth with severe disabilities. It seems critical that in order for students to generalize skills learned to their everyday life, that they be able to practice those skills throughout the day. A more comprehensive approach in which activities are ongoing throughout the classroom and residence halls may improve the effectiveness of the intervention.

In addition, involving the students in goal-planning and intervention planning may increase success, as they will become more familiar with expectations, and increase motivation for reaching goals. Participants in this study were not aware they were even part of a study, and thus were not given a chance to express their concerns in regards to social skill weaknesses. Future studies in which participants and researchers work collaboratively to establish goals, expectations and approaches is necessary to better our understanding in this area.

### **Conclusion**

The ESI provided a standardized tool to evaluate the effectiveness of a goal-directed after-school program on social interaction among youth with neurodevelopmental disabilities. The program was not effective in enhancing their social interaction performance, indicating that an isolated intervention is not effective in addressing their unique needs. There is a need for future research involving a more comprehensive intervention, embedded throughout the school day.

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